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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
GAKH, YELENA G	

ART UNIT	PAPER NUMBER
1743	

DATE MAILED: 11/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/628,991	CHOU, MAU-SONG	
	Examiner	Art Unit	
	Yelena G. Gakh, Ph.D.	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08/21/06*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14 and 21-26* is/are pending in the application.

4a) Of the above claim(s) *4 and 13* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-12,14 and 21-26* is/are rejected.

7)☒ Claim(s) *25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Amendment to the specification and claims and Terminal Disclaimer filed on 08/21/06 are acknowledged. Claims 1-14 and 21-26 (sic! see below) are pending in the application. Claims 4 and 13 are withdrawn from consideration as being directed toward non-elected species.

Claim Objections

2. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claim 25 (second) been renumbered claim 26.

Response to Amendment

3. In response to the amendment and terminal disclaimer objections to the specification and claims 2 and 11 and rejection over double patenting are withdrawn. Rejection of the pending claims under second paragraph of 35 U.S.C. 112 and over the prior art is modified in light of the Applicants' arguments.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-3, 5-12, 14 and 21-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1 and 24 it is not apparent as to what is a chemical and/or biological aerosol *in* a sample cloud in the air? According to "Dispersal and Fate of Chemical Warfare Agents", "once a chemical weapon has detonated, it creates a "primary cloud", a solid or liquid aerosol cloud" (see the first sentence). Therefore, the examiner considers the chemical and/or biological aerosol the sample cloud.

From claims 1, 8, 21 and 24 it is not clear, which radiation source the claims recite, since a variety of radiation sources, such as radiofrequency, gamma ray, X-ray, microwave, lasers, and other radiation sources can heat the sample. The indefiniteness of the radiation source renders the claims indefinite. Furthermore, it is not apparent as to which "emission from the cloud" the claims recite, since heating the cloud can decompose the content of the cloud and yield "emission gases", which will give spectra depending on the radiation source. If the Applicants mean "infrared emission", then the terms "infrared radiation source" and "infrared emission" should be recited in the claims. The expression "generating an emission spectrum of the chemical and/or biological aerosol in the cloud from the emissions" corresponds the first interpretation of the term "emission" as emission gases, which give spectra.

It is further not clear, if the system recited in claims 1 and 21 is designed for local of remote detection, which is essential for the system set-up and operation. Local and remote detection requires different system elements and refer to completely different embodiments. Such ambiguity in the claim recitation renders the claims unclear and indefinite.

From claims 8 and 24 it is not apparent as to what is the difference in positions between the radiation source and the spectrum analysis device, which both appear to be positioned "relative to the first end of the chamber". It is not clear, how are they positioned relative to each other? The structural relation and arrangement of the system recited in all independent claims is not clear and definite. Moreover, "the spectrum analysis device" is usually a complex system on its own, comprising detector along with other structural elements. It is not apparent, whether it is the detector that is "positioned relative" to the first end of the chamber?

From claim 10 it is completely unclear as to how the powder is related to the aerosol of the parent claim. Which powder is meant here?

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 1-3, 5-7 and 21-23** are rejected under 35 U.S.C. 102(b) as being anticipated by Bernstein et al. (US 4,496,839, IDS).

Bernstein indicates: "disclosed is a system and method for remote detection and identification of unknown chemical species in gaseous, aerosol, and liquid states. A pulsed infrared laser is directed at an unknown chemical mass, which absorbs energy at the laser wavelength. Due to molecular energy transfer processes, the absorbed laser energy can be re-emitted in one or more wavelength regions nonresonant with the laser wavelength. The re-emitted energy is detected for a period of time which is comparable to or less than the characteristic time for the absorbed radiative energy to be dissipated as heat. The nonresonant infrared emission spectrum of the unknown chemical species is detected with several infrared detectors. The identity of the unknown species, as well as its range and concentration, may be established by comparison of its spectrum to that for known species" (Abstract). A radiation source is a "CO_2 infrared laser whose output at wavelength λ_0 =9.4 m, is directed to steering expansion mirror 14 and then to steering collimating mirror 16 in the transmitting optics, from which it is directed to the unknown chemical species 18. The returning radiation 20 includes λ_0 plus emission radiation λ_1, λ_2, in the 8-14 μm range. The returning radiation 20, including the laser wavelength λ_0 and other wavelengths λ_1 and λ_2 emitted by the excited molecules of the chemical species, strikes primary collector mirror 22 and secondary collector mirror 24 in the collecting optics. From the collecting optics the returning radiation 20 is separated by monochromator 26 into the wavelengths λ_0, λ_1, λ_2,. . . and λ_n, which are sensed by detectors 30, 32 and 34, ... The outputs of detectors 30, 32 and 34 are delivered to data acquisition circuit 36, which provides to comparator/analyzer 38 the spectral characteristic from the outputs of detectors 30, 32 and 34. Comparator 38 compares the intensity of the spectral characteristic

provided by detectors 30, 32 and 34 with that of known species from reference spectra circuit 42 to determine the identity of the unknown chemical species 18" (col. 2, lines 67-68, col. 3, lines 1-21).

8. **Claims 1-3, 5-7 and 21-23** are rejected under 35 U.S.C. 102(b) as being anticipated by Taylor (US 5,373,160).

Taylor discloses: "as shown in FIG. 1, the hazardous air pollutants monitor 35 according to the invention comprises four main components. These are **a CO_2 laser 22**, a nonlinear crystal or doubler 42, a receiver 44 including an acousto-optic tunable filter 46, and a computer 48 for analyzing collected data and for controlling system operation. Preferably, these elements are coupled optically using **a beam expander 52**, a gimballed turning mirror 54, and a **directable receiving telescope 56**. The laser 22 and beam expander 52 direct illumination along the beam path 80, and are mounted commonly with the telescope 56 to illuminate and view along a common path between the measuring system 35 and a remote topographic target. The telescope 56 focuses light from the sample on at least one, and preferably two detectors 62, 64. The detectors, which may be point detectors, line arrays, or focal plane arrays, can include a **7-14 μm detector 62** and a **3.5-7 μm detector 64**, which are operated selectively in conjunction with control of the illumination wavelength selected by the laser output means, generally designated 76. The detectors 62, 64 are controllably coupled to an electronic controller, preferably provided as a function of **computer 48**, that sequences system operation and analyzes the collected data to decode the measurement results" (col. 6, lines 15-39). The CO_2 laser irradiates the sample with a

9. **Claims 1-3, 5-7 and 21-23** are rejected under 35 U.S.C. 102(b) as being anticipated by Childers et al. (Atmos. Env., 2001) as evidenced by Taylor.

Childers teaches "multi-pollutant concentration measurements around a concentrated swine production facility using open-path FTIR spectrometry" (Title). "Spectral data were collected with an AIL Systems, Inc. RAM 2000 Remote Air Monitoring System. In this monostatic OP/FTIR monitor, the spectrometer module contains an IR source, detector, interferometer, transmitting/receiving telescope, external beamsplitter, and associated electronics". While Childers does not specify IR source, CO_2 lasers are conventional IR sources for OP/FTIR systems, as evidenced by Taylor. The CO_2 lasers irradiate the sample with a frequencies, which are resonant to the vibration frequencies of the target molecule.

10. **Claims 1-3, 5 and 21-23** are rejected under 35 U.S.C. 102(e) as being anticipated by the prior art disclosed in Johnson (US 2004/0211900) as evidenced by Taylor.

In **Background of the Invention** Johnson discloses various FTIR spectroscopic systems for active and passive remote analysis of gases in atmosphere, with active systems comprising an active source of IR radiation, a telescope for collimating the radiation, and IR detection system with necessity of co-alignment of the IR sender and receiver telescopes (col. 1, and 2, paragraphs [003] and [004]). Although Johnson does not specify using lasers, specifically CO_2 laser as active sources, they are notoriously well known in the art of active remote FTIR detection, see e.g. Taylor above. Therefore, Johnson could have mentioned CO_2 laser as a known IR source in remote FTIR analysis. The principle of active FTIR spectroscopy of **the prior art** disclosed Johnson is **heating the sample** and detecting its IR spectrum vs. colder background, see page 1, [0003], [0004], which means that any radiation source will heat the sample by exciting its vibration levels, followed by detecting emission spectrum of the sample components.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. **Claims 1-3, 5-7 and 21-23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Thériault et al. (Pure Appl. Opt., 1998).

Thériault teaches "remote monitoring of cloud parameters from ground-based FTIR measurements" (Title) using DREV (Defense Research Establishment Valcartier) Fourier spectrometer DBIS (double-beam interferometer sounder). "Essentially, DBIS is made of one or, optionally two 10 in diameter Cassegrain telescopes optically coupled to a double-input-port Fourier transform spectrometer and two detection units (output optics 1 and 2). Figure 1 summarizes the design of the instrument" (page 890). While Thériault discloses the system for passive FTIR analysis, active FTIR analysis involves using IR source such as CO_2 lasers, and therefore it would have been obvious for any person of ordinary skill in the art to modify Thériault or passive FTIR systems by incorporating laser IR source for active FTIR detection and analysis.

14. **Claims 8-9, 11-12, 14 and 24-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Samuels et al. (Proceed., 2001, IDS) in view of Bernstein.

Samuels discloses a system for "infrared spectral study of aerosolized ovalbumin and aerosolized *Bacillus subtillis* and *Bacillus thuringiensis* spores" (Title), comprising a rectangular aerosol chamber with a ZnSe window on one side with MIDAC FTIR spectroradiometer and a blackbody radiation source for heating the sample.

While Samuels discloses heating the background relative to the aerosol cloud by using the blackbody source, Bernstein teaches successful detection of the aerosol clouds by heating the aerosol cloud with CO_2 laser source *vs.* the background and detecting emissions from the excited molecules of the aerosol.

It would have been obvious for any person of ordinary skill in the art to modify Samuels's apparatus for detecting IR emission of the aerosols using blackbody radiation source for heating the background with Bernstein's arrangement for heating aerosol cloud by CO_2 laser source *vs.* the background and detecting emissions from the excited aerosol molecules, because Bernstein demonstrated efficiency of his method even for the remote detection, which would therefore have a high expectation of success for detection in a reaction chamber.

15. **Claims 8-9, 11-12, 14 and 24-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernstein in view of Samuels.

The teaching of Bernstein's prior art is presented in paragraph 6.

Bernstein does not teach the system for local detection in laboratory chamber.

Samuels discloses a system for "infrared spectral study of aerosolized ovalbumin and aerosolized *Bacillus subtillis* and *Bacillus thuringiensis* spores" (Title), comprising a rectangular aerosol chamber with a ZnSe window on one side with MIDAC FTIR spectroradiometer and a blackbody radiation source for heating the sample.

It would have been obvious for any person of ordinary skill in the art to modify Bernstein's system for remote detection of the aerosols in light of Samuels's teaching for local detection in the reaction chamber with Bernstein's set-up of heating the aerosol cloud with CO2 laser and detecting the emission from the excited aerosol molecules, because Samuel discloses the efficiency of similar detection in laboratory conditions.

16. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Samuels in view Bernstein or Bernstein in view of Samuels, as applied to claims 8-9, 11-12 and 24-26 above, and further in view of Ho (US 4,710,887) or Carlon et al. (US 4,568,190).

Samuels Bernstein or Bernstein in view of Samuels do not specifically disclose a fan in the chamber.

Ho discloses a small electric fan 20 housed with the chamber 10 to distribute the aerosol within the chamber (Figure 1, col. 2, lines 7-9) and Carlon discloses a rotary gab 20 for homogenous spreading of the aerosol particles in the chamber (Figure 1).

It would have been obvious for any person of ordinary skill in the art to introduce the fan disclosed by Ho or Carlon in Samuels-Bernstein's or Bernstein-Samuels' system for more homogenous distribution of the aerosol particles in the chamber.

Response to the Applicants' Arguments

17. In response to multiple Applicants' references to description of the second paragraph of 35 U.S.C. 112, the examiner would like to indicate that the rejections under this paragraph were established exactly on the basis of this description. Thus, the examiner did not intend "to improve clarity or precision of the language used" with the language satisfying the statutory requirements of 35 U.S.C. 112, second paragraph, since the language of the claims, from the

examiner's point of view, does not satisfy these requirements. Also, the breath of the claim is not the basis of this rejection. The basis for the rejection was (and is) the indefiniteness and non-clarity of the claims. The examiner re-writes the basis for the rejection in order to make it clearer for the Applicants, as to what the examiner specifically considers to be a deficiency in the claims language. In particular, avoiding a recitation of a specific spectroscopy (infrared) renders the claims unclear and indefinite, since multiple interpretations are possible for these claims, which makes it unclear as to what specifically is claimed. The examiner outlined all problems with the claim language in more details and respectfully expects an adequate response from the Applicants.

Positioning a spectrum analysis device "relative to the first end" does not actually define its position, especially since the radiation source is positioned in the same location. The structural relations between the elements of the system are vague and indefinite.

As for the rejection over the prior art, any irradiation of the aerosol sample with IR source leads to its heating, unless the blackbody radiation of the background with a very specific arrangement, such as taught by Samuels, is not disclosed in the reference. Also, all constituents of the sample cloud (water vapor, gas molecules, aerosol droplets, etc.), which are irradiated and heated by the IR source, will emit signals corresponding to their vibration spectra. The examiner is not quite sure, which other possibilities the Applicants mean when question the systems disclosed by the prior art with IR sources and detectors for the emission spectra?

Moreover, the separation of the terms "aerosol" and "cloud" is not quite justified, as the reference "Dispersal and Fate of Chemical Warfare Agents" mentioned above, indicates.

Regarding specifically Johnson's reference (US 2004/0211900), the examiner clearly indicated that it was not Johnson's teaching, that was applied in the rejection of the claims, but rather the prior art disclosed by Johnson. Therefore, the Applicants misinterpreted the examiner's rejection.

Thériault was not used as an anticipatory reference, and was properly modified to result in the Applicants' invention with the well established motivation of such modification.

Regarding Carlon (sic!) and Ho, it is totally unclear, as to why the Applicants believe that the secondary references should disclose each and every detail of the claimed invention, rather than cure the deficiencies of the primary references, which they perfectly do?

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (571) 272-1257. The examiner can normally be reached on 9:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

10/10/06

Yelena Gakh

YELENA GAKH
PRIMARY EXAMINER